August, 1957

THE CHEMIST

VOLUME XXXIV NUMBER 8

New Jersey Chapter presents three Scrolls. Top. Left to Right: Dr. Max Bender, chairman, New Jersey AIC Chapter, presents Honor Scrolls to Dr. H. W. Mackinney, and Leon R. Joslin.

Chester A. Amick, left, (in Europe at time of presentation) received the third Honor Scroll.

(See page 299.)

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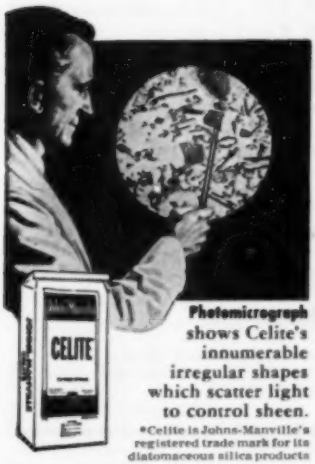

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Copy for the October issue of The Chemist should be in our hands before September 10th. Advertising copy for October should be received not later than September 15th.

THE AMERICAN INSTITUTE OF CHEMISTS does not necessarily endorse any of the facts or opinions advanced in articles which appear in THE CHEMIST.

The good that chemists can do in community affairs is well illustrated by the activities of the New Jersey Chapter, as reported on page 297.

IN THIS ISSUE

Editorial:

Will You Suggest Someone? Message **295**

Special AIC Announcements:

New Officers of Alabama Chapter, Washington Chapter **295**

New Officers of Ohio Chapter, Chicago Chapter **296**

Will You Come **296**

Science Education Aided by New Jersey Chapter **297**

A Night of Honors **299**

The Destructive Side of Creativity, Dr. Herbert A. Shepard **303**

The Old Professional Man, Report of Committee on Manpower **309**

The University of Alaska, Dr. Robert Rie **313**

Annual Report of the New Jersey Chapter **316**

Council **318**

AIC Activities:

Report of the Professional Committee of New Jersey Chapter **318**

For Your Library **320**

Opportunities **322**

TO COME IN SEPTEMBER

The AIC Committee appointed to prepare a *Manual of National Council Operations* has completed its task. This new *Manual* will be published in full in the September issue of THE CHEMIST, not only to serve as a guide for officers and councilors, but because it contains so much vital information about the operations and purposes of the AIC that every member will profit by reading it. Other interesting material will be included in the September issue, as space permits.

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Baker & Adamson Division ..... Inside Front Cover
J. T. Baker Chemical Company ..... Inside Back Cover
Bios Laboratories 312
Busher Employment Ageny 322
Food Research Laboratories 321
Harchem Division 294
Johns-Manville 291
The Lento Press 321
Arthur D. Little, Inc. 315
Molnar Laboraories 317
Nopco Chemical Company 302
Phoenix Chemical Laboratories 317
Robinette Research Laboratories 296
Scientific Glass Apparatus Co. 308
Foster D. Snell 322
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Truesdail Laboratories 320
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EDITORIAL

Will You Suggest Someone ?

(A Message from the AIC Committee on Medal Award)

THE Gold Medal of THE AMERICAN INSTITUTE OF CHEMISTS is given to the person who, in the opinion of your Committee on Medal Award, has greatly contributed to the growth of the professional status of chemists or chemical engineers. You may have noted that former recipients fall into two main classes—teachers or industrial executives. Perhaps this is as it should be, as these have the greatest opportunity to improve the professional status of others.

On the other hand, your committee, would like to know if there is some individual who is not a distinguished professor nor a nationally known industrial leader, but whose "extra-curricular" activities have been concentrated in helping fellow chemists or chemical engineers. Such a person probably has no medals and has no organization under him. He is probably known and admired locally but not nationally. He may be a truly great scientist, but he refuses to accept a teaching or executive position in spite of his intense interest in his fellow scientists.

Perhaps such a person does not exist, but if you know him, please tell us! (*Address letters to The Committee on Medal Award, The American Institute of Chemists,* 60 E. *42nd St., New York* 17, *N.Y.*)

Special AIC Announcements

New Officers for Alabama Chapter

Chairman, Dr. Charles E. Feazel, 827 Sims Avenue, Crestline Heights, Birmingham 9, Alabama.

Secretary, Martin B. Williams, 402 East Holmes St., Huntsville, Alabama.

Treasurer, William C. Ingersoll, 5409 Panorama Drive., S.E., Huntsville, Alabama.

National Council Representative, Dr. Emmett B. Carmichael, Medical College of Alabama, 1919 7th Ave., South, Birmingham 3, Alabama.

Washington Chapter Officers

President, Dr. Carl J. Wessel, National Research Council, 2101 Constitution Ave., Washington 25, D.C.

Vice-President, Albert F. Parks, Bureau of Customs, Internal Revenue Bldg., Washington 25, D.C.

Secretary, Frederick S. Magnusson, Bureau of Foreign Commerce, U.S. Dept. of Commerce, Washington 25, D.C.

Treasurer, Albert P. Mathers, Alcohol Tax Unit., Dept. of Treasury, Internal Revenue Service, Washington, D.C.

National Council Representative, Dr. Carl J. Wessel, National Research Council, 2101 Constitution Ave., Washington 25, D.C.

New Officers of The Ohio Chapter

Chairman, Donn F. Siddall, U. S. Stoneware Company, P.O. Box 350, Akron 9, Ohio.

Chairman-elect, Dr. Joseph H. Koffolt, Ohio State University, Department of Chemical Engineering, Columbus 10, Ohio.

Secretary-Treasurer, Dale F. Behney, Harwick Standard Chemical Co., 60 South Seiberling St., Akron 5, Ohio.

National Council Representative, Dr. David M. Gans, Arco Co. Subsidiary of American Marietta, 7301 Bessemer, Cleveland 4, Ohio.

Chicago Chapter Officers

Chairman, Dr. Harold M. Coleman, General American Transportation Corp., 150 W. 151st St., East Chicago, Indiana.

Chairman-elect, Albert S. Henick, Quartermaster Food & Container Institute, 1849 W. Pershing Road, Chicago 9, Illinois.

Vice-chairman, John Krc, Jr., Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

Secretary, Miss Rose Marie Brunetti, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

Treasurer, Dr. C. A. Johnson, University of Illinois, College of Medicine, 1853 W. Polk St., Chicago 12, Ill.

National Council Representative, Bernard E. Schaar, Schaar & Co., 754 W. Lexington St., Chicago 7, Ill.

Will You Come

August 9, 1957. Alabama Chapter. Dinner 6:30 p.m. at YWCA, 309 North 23rd St., Birmingham, Alabama. Speaker, Dr. Paul Tarrant, professor of chemistry of the University of Florida; special chemical consultant in high energy propellant research, U.S. Army. Illustrated talk, "Progress in Fluorine Chemistry." Reservations: Dr. Charles E. Feazel, Southern Research Institute, 2000 9th Ave., So., Birmingham. (Dinner $1.50) AIC members visiting in the area are welcome to attend this meeting.

April 10-11, 1958. Thirty-fifth Annual Meeting. THE AMERICAN INSTITUTE OF CHEMISTS. Ambassador Hotel, Los Angeles, California. Host: The Western Chapter.

"Our schools do not perform their primary purpose which is to train the nation's brain power to the highest potential . . . We shall not do justice to our talented youth until we seek them out at an early age, no later than 10 or 11, and educate them separately from the rest of the children . . . preferably in separate schools or, if this is not possible, in separate classes."

—Rear Admiral H. G. Rickover, United States Navy.
(Speaking before the Thomas Alva Edison Foundation)

Appointed: Dr. Jasper H. Kane, F.A.I.C., to the Board of Trustees of Adelphi College, Garden City, N.Y. He is vice president in charge of research and development for Chas. Pfizer & Co., Inc., Brooklyn, N.Y.

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Science Education Aided by The New Jersey Chapter

THE New Jersey Chapter of THE AMERICAN INSTITUTE OF CHEMISTS, through extraordinarily effective committees, has succeeded in giving material aid to the New Jersey State Teachers' Colleges. Its accomplishments may be summarized as:

(a) A $15,000,000 grant from the State of New Jersey in behalf of the six State Teachers' Colleges. The money has been received and is being utilized in the construction of twenty-one new units for the six colleges.

(b) Of the amount about $3¾ million went to the Teachers' College at Montclair for the construction of new facilities for science instruction and for nine other units.

(c) Advice in planning and construction (report plan and cost estimate) of the new science facilities at Montclair State Teachers' College. This was given by a Committee consisting of Chester A. Amick, chairman; Dr. H. W. Mackinney, and Leon R. Joslin. The building, now completed, incorporates almost all of the recommendations of the Committee.

How it Was Done

Historically, the activities of the Chapter aiming for State Aid started on November 18, 1948, when Councilor R. W. McLachlan brought to the attention of the New Jersey AIC Chapter Council the deplorable condition of the laboratories in the Science Department of the Montclair State Teachers' College, which is the only one of the six State Colleges which trains high school science teachers. A committee consisting of Dr. Mackinney, chairman; Dr. A. G. Hill, D. A. McLean, and Dr. Paul Allen, Jr., was appointed. This committee visited the college in December, 1948, inspected the science department; interviewed the president, Dr. H. A Sprague, and the science staff (Professors Glen, Reed, and others). The Committee's report, accepted by the New Jersey Chapter Council on March 7, 1949, praised the college faculty but was extremely critical of the State government for its meagre provision of physical teaching facilities. The Committee was instructed to try to get some improvement.

Following this, the Committee met with Assemblywoman Grace Freeman, Chairman of the Education Committee of the House, who had just received the Honor Scroll of the Essex County Education Association for having done the most for education in Essex County, even though she had not been connected with a school system. On her advice, the Committee sent copies of its March 7, 1949, report to the Governor, to the Commissioner of Education, and to the members of the appropriations committees of the Assembly and

Senate, urging inclusion in the State budget of $750,000 for a new science building at Montclair State Teachers' College. The State Board of Education inspected the Montclair college in September and placed the item in its budget request. *The Newark Sunday News* (November 20, 1949), other New Jersey newspapers, and Radio Station WPAT gave the Committee's report extensive coverage. In spite of this, however, the item was not included in the State budget for 1950.

Early in 1950, Miss Freeman proposed a bond issue of $10,000,000. for the rehabilitation and expansion of all six teachers' colleges. On instruction from the New Jersey Chapter Council, Dr. Mackinney, then both Committee chairman and Chapter secretary, appeared in support of the bond issue before the Essex County Assembly delegation to urge acceptance of the proposal on behalf of the New Jersey Chapter. Other interested groups, the New Jersey Education Association, the American Association of University Women, the State Federation of Women's Clubs, etc., were also represented. The proposal was accepted unanimously by the Assembly, but lost in the Senate on the "caucus rule."

The year 1950-51, during which Chester A. Amick was Chairman of the New Jersey Chapter, was a critical year. Miss Freeman again proposed the bond issue, this time at the suggestion of the INSTITUTE. On March 29, 1951, the New Jersey AIC Chapter held a public meeting at the Public Service Auditorium, Newark, N.J., in the form of a panel discussion on the bond issue. The speakers were Assemblywoman Grace Freeman, Senator Kenneth Hand, the chairman of the Committee on Education in the senate; Carleton W. Tillinghast, executive secretary of the N.J. State Taxpayers Association, and the Commissioner of Education, Dr. Bosshardt. Mr. Amick served as chairman and Dr. Mackinney as moderator.

The bond issue proposal passed the legislature and was submitted to the voters at the election held in November 1951. The political parties, the New Jersey Chamber of Commerce, the groups enumerated above, and many others supported it. Station WATV featured the bond issue on its "Know Your State" program, October 30, 1951, with a panel including President E. de Alton Partridge, new president of Montclair State Teachers' College; Mrs. Homer Joy of the American Association of University Women, and Dr. Mackinney, with R. McDougall of the WATV staff as moderator. A great many groups, PTA's, student bodies, alumni associations, etc., put in much effort in the final stages. On November 6, 1951, the State Teachers' College Bond Issue of $15,000,000 was approved by a large majority.

The Montclair State Teachers

College was granted about $3¾ million of this money. At the request of the president of Montclair State Teachers' College, the New Jersey AIC Chapter then appointed a Committee to advise on the construction of the facilities for the science building. This committee was composed of Mr. Amick, chairman, Dr. Mackinney, and Leon R. Joslin of Standard Oil Company, with W. L. Davidson of Thomas Jefferson High School, Elizabeth, N.J., as adviser. The Committee inspected the new facilities at Rutgers and Seton Hall Universities, at Teachers' Colleges at Mansfield and Lock Haven, Penn., and at New Britain, Conn., and prepared a report plan and cost estimate which was beautifully reproduced by courtesy of the Standard Oil Company. After considerable "Watchdog" activity by the Committee, the ground was broken by Mr. Amick, in the presence of the Committee, faculty and friends, in November 1954, for the science building, which is now completed.

At the Commencement exercises at Monclair State Teachers' College on June 13, 1957, Governor Meyner of New Jersey dedicated the new buildings. The Commissioner of Education and the members of his staff who had been directly concerned in the construction of the new buildings were present. The New Jersey AIC Chapter was represented by Mr. Amick. All of the invited guests participated in the academic procession.

A Night of Honors

A Committee Rewarded

THE New Jersey Chapter of THE AMERICAN INSTITUTE OF CHEMISTS presented three Honor Scrolls at its Awards Meeting, May 3, 1957, to Dr. H. W. Mackinney, of the Bakelite Company division of Union Carbide Corporation; to Leon R. Joslin of Esso Research and Engineering Company, and to Chester A. Amick of American Cyanamid Company. These three were members of one or more of the Committees of the New Jersey Chapter which made possible the new science facilities at Montclair State Teachers' College, and aid to five other State teachers' colleges. (See preceding pages.) The scrolls were presented by Dr. Max Bender, chairman of the New Jersey Chapter. Mr. Amick was in Europe at the time of this presentation, but the Scroll was accepted for him by Dr. George L. Royer of American Cyanamid Company. (After his return from Europe, at a special luncheon in his honor, Mr. Amick received the Scroll from Dr. Royer.)

Dr. E. de Alton Partridge, president of Montclair State Teachers' College was introduced. He expressed his appreciation to the New Jersey Chapter and to the Committee for

Dr. Bender presents citation to W. Eugene Johnson, Jr.

the new science facilities at the College. "We held out for the recommendations for construction of the laboratories as made by your Committee, and came out with the finest laboratories anywhere in the country. We feel a particular debt of gratitude to this Committee for its long hours of work."

The citations to Dr. Mackinney and to Mr. Amick each read:

In recognition of his contribution to the training of present and future scientists and of his work and leadership in technical and professional societies. His efforts in behalf of the new science building for Montclair State Teachers' College serve as an example of the professional service of a chemist to his community.

The Scroll to Mr. Joslin reads:

In recognition of his contribution to the training of present and future scientists and of his work in planning industrial and academic science centers. His work in behalf of the new science building for Montclair State Teachers' College exemplifies the professional service of an engineer to the community.

A Teacher Honored

Dr. Bender presented a Citation in recognition of long meritorious, and inspirational service in the teaching of chemistry to W. Eugene Johnson, Jr., of Westfield High School, West-

field, N.J. This citation was made

On the occasion of his retirement from Westfield Senior High School, after thirty-six years of teaching science with patience, humor, and wisdom.

Scholarship Recognized

Student Medals from the New Jersey Chapter of THE AMERICAN INSTITUTE OF CHEMISTS were presented to the following outstanding senior students of chemistry or chemical engineering in New Jersey: George Weiss of Rutgers University, who was sponsored by Prof. Philip A. Vaughan; Leo F. Ryan of Newark College of Engineering, sponsored by Prof. M. Leland Branin; Philip Eaton of Princeton University, sponsored by Prof. Richard K. Hill; Miss Patricia H. Guerity of Douglass College, sponsored by Prof. Roger S. Sweet, and John M. Ricci of Seton Hall College, sponsored by Prof. Ellis Brown.

The Great Odyssey

The guest speaker was Dr. Detlev W. Bronk, president of the National Academy of Sciences and president of Rockefeller Institute. Deeply imbued with the spirit of wonder, creativeness, and enthusiasm, characteristic of many great scientists, he spoke of science as the great odyssey of the human spirit. He mentioned the dramatic scientific developments that had taken place since his ancestor settled on the Bronx River, N.Y., some 300 years ago. "Today, man is rapidly changing the environment in which he lives, by his own efforts, and we cannot speed the powers of adaptation fast enough. We are now dependent on science to solve the problems created by science. . .

"When I hear it said, we do not have enough scientists, I must reply that there is one simple way to increase scientists—let them put in a six-day work week, if necessary, instead of a five-day week; let them work ten or twelve hours a day instead of seven or eight. If we recognize the need of our society for more scientists, then let us recreate the old pioneering spirit of hard work. We have persuaded young people today that there is something unpleasant about hard work. One of our truly great needs is for more emphasis on the satisfactions of hard work . . . There is a growing need for scientists as for all creative workers, but we shall always need more people who know the deep joy of hard intellectual effort and the great satisfactions that can develop from it. Almost all of the early scientists had a tremendous curiosity—and the will to satisfy it. . .

"Today when we train people to do research, some will go off into administration, or seek to earn a livelihood in other ways. It is my conviction that the spirit of science must be preserved. Science is the great odyssey of the human spirit. I do not want to see it prostituted into a mere

means of making a livelihood. Man differs from the beast through his spirit, his curiosity. Idealism motivates those who follow the career of a profession. . .

"There are more courses in the graduate studies of our universities today than in years past. In fact, graduate training is becoming more and more a continuation of undergraduate training, yet the degree given is the degree of philosophy—the Ph.D. There should be the inclusion of some scholarship in graduate education. . ." Dr. Bronk described the graduate program at Rockefeller Institute, which is intended to enable "more students to study more and be taught less. A person must learn to think without recourse to a series of lectures all prepared . . . One learns better if he has time to learn and not listen to teachers too much. . . Students should have a broad foundation on which they can build. Those who make the greatest progress in the future are those who can grow."

He admitted the need of some specialization but concluded that rigid "specialization of science is a tragic thing. There is a relationship of science to all other forms of intellectual things, and one of the great heritages of the human spirit is its ability to wander into new fields of knowledge . . . Man does not wish to live a sessile life. In change there is growth. In science, to travel hopefully is better than to arrive."

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The Destructive Side of Creativity

Dr. Herbert A. Shepard

Department of Economics and Social Science, Massachusetts Institute of Technology, Cambridge 39, Mass.

(Presented before the 34th Annual Meeting of THE AMERICAN INSTITUTE OF CHEMISTS, Akron, Ohio, May 24, 1957.)

THREE themes link creativity with destruction: First, that the creative act must often be preceded by destructive acts; second, that the creative act often destroys something; third, that the emphasis on creativity is often destructive.

As to the first of these: Old structures must give way before new ones can appear. By a structure, I mean any pattern, system, plan, theory, organization, agreement, habit, tradition, belief, piece of equipment, or building. The significance of a structure is that it can be put to only a limited number of uses, and that when used, it has predictable consequences, that it shuts out more than it contains. Some structures are not highly valued by people; but people identify themselves with other structures, and a few structures acquire a sacred permanence.

We can recognize the importance of certain structures to self-esteem and career in our own work. It is said that old theories never die; their proponents pass away. Indeed, to destroy one's own theory is a trying experience. But continually testing it is a discipline forced on us by membership in the scientific community — an institutional requirement that creative channels be kept open by community willingness to destroy structures that stand in the way.

Examples of such structures can be chosen from many fields. Phenomenological psychology is fond of experiments which show how the initial perception of a problem may have to be destroyed before the problem can be solved. When a chicken is placed on one side of a short piece of fencing, and corn on the other side, it does not occur to the chicken to reexamine its initial perception of the structure of the situation: It tries to get through the fence, rather than around it. There is some evidence that when engineering students are presented with problems that can only be solved by common sense, but whose structure superficially appears to be that of familiar problems for which formulae are available, freshmen do somewhat better than seniors. They have fewer structures to destroy before proceeding to the problem.

Another experiment (by Kermath) shows that when we put two people to work together on a problem, each of whom has a distinctive approach to solving the problem, the pair is more likely to arrive at some quite

novel approach, than is either individual working alone. On the other hand, the pressure of group-shared stereotypes and customs and attitudes can also prevent any member from creative departures.

Another set of experiments shows how a social structure can prevent problem-solving. In the Ravelas communication experiments, it was found that a centralized communication system was more efficient than a decentralized system for a group solving a simple problem. However, when the problem complexity was increased, groups using a centralized communication system were unable to solve it.

This last example is especially instructive because it points to the importance of organizational structure as a deterrent to creativity. It is characteristic of science that the beliefs and actions of scientists as scientists are based not on organizational authority but on experimental evidence. The rebelliousness against constituted authority and traditional beliefs may lie behind public fear of scientists.

But, we find the managements of laboratories demanding creativity within an authority structure. Authority structures have their advantages and disadvantages. They are excellent for getting done what the boss wants done. But doing what the boss says is not creative on the subordinate's part. The creative challenge to the subordinate is to do something other than what the boss wants done. That is not an operating principle of research laboratories, though some of the most creative projects have been smuggled ones, which were denials of, though not overt and explicit destruction of, the constituted authority and rules.

The authority structure of laboratories is a boundary setting device; it does not seek to control every act. Perhaps the boss determines what and when, the subordinate how and who. That brings me to my second theme: That the creative act often destroys something. One way of stating the goals of management is to say that its efforts are to control the consequences of creativity, to keep destruction to a minimum.

Again scientific tradition makes the scientist responsible for three phases of creativity activity: Problem definition or selection, problem-solving, and communication of his solution. In the unsophisticated world of scientific tradition, communicating one's results was regarded as sufficient to get them into use by other scientists — no resistance was anticipated. In the more complex world of applied industrial science, the communication of results becomes the process of innovation — and getting something new into production and sales requires a lot of additional creativity.

Division of labor in most modern organizations results in the scientist's role being considerably narrowed. He often has little voice in problem

selection or definition; and little responsibility for innovation. Curiously, although the former restriction is the more resented by scientists, the latter is the more important. For it is in innovation, in the consequences of creativity, that the danger of destruction of highly valued things is greatest. Left uncontrolled, creativity creates chaos; it almost is chaos. Anthropologists and some historians note that the creative societies and the creative periods are characterized by disorderliness — something approaching anarchy; societies in which the individual is faced by uncertainties in many aspects of living. For many years this country has been a prime example.

But within an organization, we cannot afford much chaos. It destroys morale, efficiency, and the singleness of purpose which is necessary for institutional success. Severe limitations must be put on the rate and kind of innovation. Some organizations can accomplish internal readjustments more easily than others, but for all organizations internal change is a first-class problem. Take the innovation of large-scale computing equipment. It destroys accounting empires, it deskills executives; it has brought the segments of decentralized companies into almost open warfare with headquarters. Innovation even of a new process or product is likely to destroy jobs, reduce certain skills to worthlessness, change relationships, divest vested interests, cause severe conflicts among engineering, production and sales, and so forth.

The above considerations lead to one of the most puzzling phenomena in industrial life: On the one hand, increased pressure on the laboratory for more and better innovative ideas; and on the other hand, strengthening of measures to prevent the laboratory from being a powerful innovative force. This frustrates laboratory director and research worker alike. A common concern of laboratoy directors is how to sell the laboratory's output to management—a commentary on the laboratory's power as an innovative force. But organizational traditions and scientific bias combine to keep the laboratory's power small. If we use that muddy organizational theory called staff-line in our managerial thinking, the laboratory obviously becomes a staff department —advisers to this line, without authority. But in a well-designed industrial organization, management's principal decision-making responsibility falls in the area of major changes in the direction of organizational effort. That kind of thinking would make research and development the line organization, since innovation is their business. It does not often happen that way. Another check on the laboratory's power is the definition of scientists as impractical and naive in the affairs of business—a definition which is supported by the scientists themselves. That is, their role is limited, often by themselves, to the tech-

nological aspects of innovation. Market research, organizational research, general economic research, etc., are located elsewhere in the firm. So the laboratory cannot bring to bear the same intelligence in connection with these aspects of innovation as it can for the technical aspects. In fact, these other aspects are likely to be regarded as unscientific, an attitude which perpetuates the laboratory's weakness as a creative force in the company.

Exploration of the second theme—preventing creativity from having destructive consequences — leads to the third theme: The emphasis on creativity is often destructive. In the first place, the emphasis on creativity derives largely from management's concern with justifying the cost of research and development effort, with evaluating research results. Top management rather than the scientists make this evaluation, and the research director is in the position of selling top management — a phrase which faintly suggests that the product being sold is no bargain. The research director needs something sensational to sell, something that sells itself, something that anyone can see will make a real contribution to company profit. So the pressure is on the staff to be creative, and the staff reacts to this pressure with a good many semi-neurotic and semi-profitable activities like brainstorming, and creativity courses. The atmosphere becomes a little frenetic, but everybody wants the training. Great scientists are creative, and every scientist wants to be great. Then perhaps the research director becomes concerned about the aging of his staff. He and they have seen Lehmann's curves on declining creativity with advancing age, and also the more recent studies which try to take some of the pain out of those curves. The day will come when the whole staff is over the hump. Out of all this we hope to build an atmosphere and environment conducive to creative work.

The emphasis on creativity need not be explicit; it may be implicit in the organizational structure. Let us look at a basic research unit of a research and development laboratory reporting to the manufacturing department of the firm. The top management tolerates the basic research unit but sees nothing coming out of it. Anything new and worthwhile by way of creative ideas is coming out of the development work. The people in development get recognition for their contributions and move up the ladder into highly paid management jobs. The people in basic research are regarded as long-hairs, unsuited to management. What happens? In the basic research group, a state of low morale and interpersonal conflict, abandonment of sound principles of research planning and systematic investigation, a frantic, unorganized search by individuals, using Edisonian methods, for the really sparkling idea

that will pay off and retrieve their reputation, and gain them respect and reward. The panic is fruitless, as are all panics.

In summary, creativity involves replacing old structures with new. In our efforts to control the process so that it will go on in an orderly, profitable and relatively painless manner, we have sometimes made the error of putting pressure on scientists to innovate, while at the same time building pressure against innovation. Sometimes the error is made of giving creativity courses, good in themselves, in an organizational environment which is not conducive to creativity. Perhaps we need to look more closely at the organizational structure which builds contradictory pressures within itself. We cannot assume that structures which are stable when continuous, repetitive, economical production is required will also be stable when continuous adaptation to change is required. The latter is becoming the rule for modern industry, and we need new organization principles to take advantage of innovative opportunity.

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Speaker: Dr. Daniel H. Terry, F.A.I.C., vice president in charge of research and development of The Bon Ami Company, who spoke on "The Jet Bon Ami Story," at the annual meeting of the Association of American Soap & Glycerine Producers, Inc., January 25th. Dr. Terry developed the formula for the new Jet Bon Ami.

Announced: By Harry M. Zimmerman, F.A.I.C., general manager of the Plastics Division of Seiberling Rubber Co., Newcomerstown, Ohio, that Bernard B. Bowling has been added to the sales staff.

New Position: For Dr. Harry H. Fall, F.A.I.C., who is senior research chemist, Research & Development Department, The General Tire & Rubber Co., Akron 9, Ohio.

The Scientist's Obligation

"The scientist as a scientist is bound to search for the truth, no matter to what ends such truth may be put. The scientist, as a scientist, is not interested in formulating judgments concerning moral values. It is the duty of science to make the truth known; it is the duty of philosophy and religion to evaluate that truth in terms of human aspirations and ideals; and it is the duty of education to teach men to use it for the betterment of mankind."

—Dr. Irving P. Orens
(*in NCE Today*)

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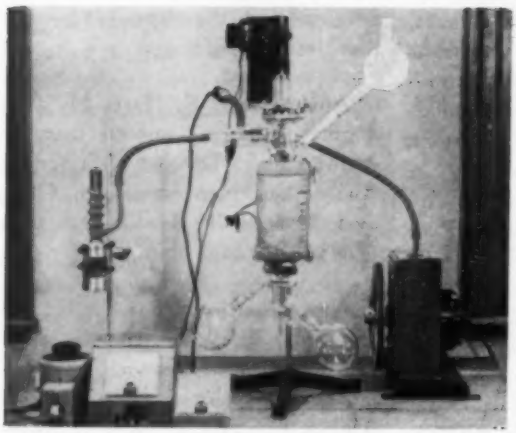

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The Older Professional Man

(Report by the Committee on Manpower, presented at the 34th Annual AIC Meeting, Akron, Ohio.)

AT the 33rd Annual Meeting, the Manpower Committee was charged with the responsibility of reporting on the employment of the older professional man, specifically the man over forty. In the present full economy with its shortage of scientific personnel, the question is whether the older professional has the same opportunity for employment as the younger. A request was placed in THE CHEMIST asking for comments. It was interesting to note that more replies called the committee's attention to men who had been employed after forty than to situations where men over forty were unable to obtain employment. This, however, does not mean that the man over forty has the same opportunity for employment. It is a fact that the older man's employment problems differ from those of the college graduate or younger man.

Today, conditions are different than in the thirties when there was widespread unemployment. But even in this period of manpower shortage, the older man is often at a disadvantage in competition with the new college graduate. The man who has the most to offer to the job will be the one that is the most acceptable. Age will not be the factual reason for nonacceptability but it may be the excuse. There are jobs in which experience is an important factor and where youth would not be wanted. There are jobs where the strength and vigor of youth are necessary and age is a deterent. No general conclusions will be drawn. But it is hoped that the older man who thinks that he has no opportunity will see his situation in the proper perspective and resolve what are usually personal problems so he can have a satisfactory and pleasant life.

It is difficult to get a self-evaluation of one's abilities and limitations. Maturity has been defined as the quality of being able to obtain a self-evaluation which equals the opinions of others. By this definition some people never mature. There is a philosophy that experience and ability to do a job increases with each year of service and that this should be directly related to increased salary. In a merit and job content philosophy, age, or experience are not the controlling factors for salary. With such thinking, jobs are filled with personnel who will produce the most at a price.

The recent graduate has much to offer. He has knowledge of the latest advances in the field, learned in the university where he has been trained and selected, over four to eight years, from many who have competed and failed. He is fresh, optimistic, and does not know from experience that many things cannot be done. He is like a race horse, trained and ready for the race, but as yet untried.

Would you not put your money on this man? Most employers are doing so today, as evidenced by the high demand and competition for the college graduate.

The older man has been in many races and if he is a winner he usually has a good position. Because of his success he may have little trouble in getting another job if he chooses to advance by moving from one company to another. If, however, he moves too fast in salary and happens to fail in a job, he may find it difficult to be placed again at the higher salary. In this way he is no different from the older man who has been average or below in his performance. He, too, has difficulty in finding a job because his potential has been tested and found to be below average. At the same salary level younger men with greater potential will be hired because they offer an economic advantage.

Many of the larger companies have definite policies of promotion from within. Such a policy makes it difficult to bring in older men from the outside for positions having greater responsibility and higher salaries. There are difficult economic and psychological problems involved in hiring personnel at salaries lower than the man has achieved. There is a place for this older man if he can realize his limited potential and content himself in a job in which his potential can be used. Such a man should not look for administrative or professional positions which require the qualifications of those with the highest ability. If the man has maintained his professional ability he may have to report to a younger man in an administrative position. If he has not kept up on his science, he had better forget about his profession and get a job in the commercial part of the organization.

Industry tries to pay on a merit basis for a certain job content. The better man doing the same job will be paid more than the poorer one. Knowledge and experience will be criteria but beyond a certain point, experience makes no contribution. Thus at some point the contribution of experience becomes limiting and works against the older man whose knowledge and ability are lacking. We must not always think of experience as being a positive contribution. Bad experience or experience in another field is of no value and many times detrimental. An older man may be set in his ways and not want to try newer ways and ideas.

An older man who is mature by the earlier definition has much to contribute and is important in all organizations. The vigor and chance-taking attitude of youth must be counterbalanced by the experience of age. The older stateman's judgment is important to the stability and security of any organization. He must be in the responsible positions.

Another phase of the older profes-

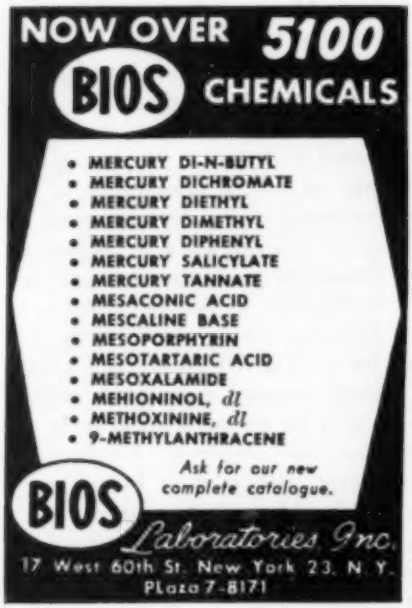
sional that requires study is the mental and psychological developments which occur with the physical changes of aging. With the increased life span resulting from better health habits and life-saving drugs there comes the need for a better understanding of the older person and his relationship to the economy. If he is to be retired he will not be a contributor to the production of the economy. He will have to be supported by the younger man who is still productive. It has been said that by 1960 every 1000 active persons, 20 to 61, will be supporting 165 dependent persons 65 or over. This raises the question of the proper policies for retirement and a study of the problems of this group. Some work has been done, but geriatrics is an important area for future study.

Due to the full employment of recent years, the older person has found it easier to obtain positions now than in the thirties, and more attention is being given to the use of manpower in this age bracket. A recent announcement by the Drug, Cosmetic and Chemical Institute states, "Not only are older scientists eagerly sought to fill executive positions but the age of retirement has been postponed five or even ten years in several drug companies. Even after retirement, many research and management scientists are kept on the payroll as consultants." This group has opened a placement service to aid employers to obtain applicants for scientific positions. Many placement services are available, both private and association operated, so your Committee does not recommend this for the AIC.

The AIC, however, must be concerned with means for making the best use of the productivity of the manpower of the older age group. It is just as important a professional responsibility to maintain creativity and productivity in this age group as to encourage youth to go into the profession. The AIC should work toward better physical and mental environments for the professional so he can gain his objectives. Employer-employee relations must be of concern to the AIC and the programs of the AIC should be aimed toward the professional point of view within the organization.

This problem of the older professional is not simple and can not be passed off on excuses of "retirement and pension plans do not let us hire the older man." If we could and would study the problem, we might change some of our ideas in regard to the relationship of salary to experience, capability, potential, etc. If we could find out how these relate to both physical and mental developments of the aging professional, we would be able to make better use of our manpower of all ages.

--Dr. G. L. Royer, Chairman
Dr. E. Durham
Dr. H. S. Bloch
O. B. J. Fraser
Dr. N. A. Shepard



Reorganization: Of the U.S. Customs Laboratory, 201 Varick St., New York 14, N.Y., makes Isidore Schnopper, F.A.I.C., assistant chief chemist in lieu of H. W. Eckweiler, retired. Edward F. Kenney, F.A.I.C., is chief chemist.

Announced: By John D. Hetchler, F.A.I.C., division sales manager for chemical products of Archer-Daniels-Midland, Minneapolis 2, Minn., the appointment of O. L. Yarham as technical sales representative in the Chicago area; John K. Lilly for the Cleveland area, and Roland W. Bonatz for the Detroit area.

Appointed: Einor E. Lund, M.A.I.C., as vice president and general manager of Textor Laboratories, Inc., 1627 E. 25th St., Cleveland 14, Ohio.

Elected: To the Board of Trustees of the Thomas Alva Edison Foundation, Inc., 8 W. 40th St., New York 18, N.Y., Dr. Charles Allen Thomas, Hon. AIC, president of Monsanto Chemical Co., St. Louis, Mo.

Appointed: James E. Henning, M. A. I. C., as vice president of Bjorksten Research Laboratories for Industry, Inc., Madison, Wisconsin.

Moved: Beckman Data & Control Systems, Scientific Instruments Division, Beckman Instruments, Inc., to 325 North Muller Ave., Anaheim, Calif.

Chairman: For heavy industry in the 1957 Red Cross campaign for members and funds for the New York Chapter, Fred J. Emmerich, Hon. AIC, chairman of the Board, Allied Chemical & Dye Corp.

On Stream: The new 40-million-pound-a-year plant of the Celanese Corp. of America, near Houston, Texas. Bjorn Andersen, F.A.I.C., vice president and general manager of the Plastics Division, says the new "low-pressure polyethylene" resin called Fortiflex, will open up new fields for plastics and will improve the qualities of many existing items.

The University of Alaska

Dr. Robert Rie

Professor of German, University of Alaska, College, Alaska

(The German original of this article was published by the *Deutsche Rundschau*, Stuttgart, Jan. 1956. The translator is Alexander A. Lukshin, graduate student in chemistry at the University of Alaska.)

THE most exterior peninsula on the end of the North American Continent forms the main region of the Territory of Alaska. With its narrow southern maritime coastline rich in fjords, Alaska represents an area lying in front of the Canadian provinces in a southeasterly direction, twice as large as Texas and nearly two and one-half times as large as France. This mighty land, transferred from the Russians some ninety years ago for a proportionately small sum of money, is administered as a Territory of the U.S.; thus transformed into a sort of colony with limited autonomous rights. Whereas Americans generally oppose colonialism everywhere, glorifying the rebellion of their thirteen original colonies, they do not grant, for the time being, the rights they acquired in the Revolutionary War to this great, rich land, inhabited by an orderly, efficient, and valiant population, not less but more numerous than the state population of Nevada. To be sure, just in the winter of 1955-56, on the academic ground of the territorial university, a constitutional convention, elected by the population, produced a constitutional bill for the future state of Alaska, which eventually was approved by plebiscite.

Alaska desires neither to be a pioneerland nor a frontier. It regrets the lack of railroad connection with the mother country. This possession of the U.S., situated on the North American continent, can be reached from Seattle only by flying or by a long highway that leads through the Canadian province of British Columbia. There are psychological reasons for this curious isolation of the Territory: The mental attitude of the Americans, who think as it were in southern conceptions. Since New York, their most famous city, lies at the latitude of Naples, the capital city of Washington is to be found, so to speak, in Sicily; but Alaska, that American counterpart of Scandinavia, appears to be in a realm of midnight! . . .

But to the gradually increasing reputation of the Territory as a normal civilized land, it is the University of Alaska, the summit of its well-organized school system, which contributes to a high degree, by the quality of its teachers and the scholastic achievements of its students. The school system itself is superior to that of many of the states.

The University of Alaska is essentially a technical university that looks back on a development which,

by European standards, could be called quick and growing. Congress passed a bill in March, 1915, that set aside an extended tract of land, a total complex of real estate, which even today forms the most important property of the university, intended for the establishment and maintenance of a territorial college and mining school. The corner stone was laid on Independence Day, 1915. The Territorial Legislature two years later, May 3, 1917, accepted the land donation, and created a corporation, the Alaska Agricultural College and School of Mines. Most of the landed property is in the hands of the U. S. Government, and even real estate that would be needed for the school must be transferred through a grant from the Union to the Territory.

The college was opened in September, 1922 . . . The first president, the late Charles E. Bunnell (d. 1956), who also won great repute as a federal judge in the Territory, did not rest until his growing institution was reorganized by a Territorial Act, July 1935, as the University of Alaska.

The University has a prominent graduate school offering Masters' degrees in geophysics, physics, chemistry, education, English, and wildlife management. Physics and geophysics can be pursued further to a doctorate. The University hopes soon to be able to offer higher courses in the foreign languages leading to a Master's degree.

The chairmanship of the Department of Chemistry and Chemical Engineering of the University is held by Dr. William S. Wilson (F.A.I.C.). He is assisted in chemical engineering by Dr. Nalin R. Mukherjee, and in chemistry by Charles T. Genaux (M.A.I.C.). A student satisfactorily completing the prescribed courses in chemistry or chemical engineering is awarded the B.S. degree after four years. Due to the rapidly expanding enrollment, the department is hoping to have an additional staff member for the coming semester, and to move into a new building with increased space.

Unfortunately, Alaska's progress in industrial chemistry, so necessary for stimulating interest in chemistry itself, has been unnoticeable in any area except that of paper chemistry; and that is important only in Southeastern Alaska's pulp mills, some 700 miles from the University. Because of this lack of industrial choice, the present concern of the department is to give students as thorough a foundation in chemical principles as is required by other technical departments of the University. Few students have continued into the further exploration of the field. It is hoped that an additional member of the department will alleviate the burden of the elementary courses and permit more advanced courses to be offered, and thereby stimulate more intrest in chemistry.

The research program of the de-

partment is so closely coordinated with the activities of the Geophysical Institute and the School of Mines that it is not readily identifiable. The department maintains the Arctic Weathering Testing Stations, where materials exposed to the conditions of an Arctic year are observed. Some metallic compounds found in Alaska are so unusual that new methods must be devised for their identification and commercial separation. In connection with the Geophysical Institute, the department has also been assisting with the work of studying the upper atmosphere. Particular interest is given to the study of the Northern Lights and their occurrence as explained by free radical mechanisms.

Though the student body of the University is recruited from all of the United States, naturally a greater percentage is native of Alaska. Every visitor to our college is interested especially in the "natives" (in the special sense not of the white Alaskans, but of the Indian and Eskimo students). Usually the first view of our natives results in disappointment that they do not appear as in folklore; they are young people dressed in the American way, by no means shiny with cod liver oil or somehow quaint. They study whatever the course of instruction offers. Quite often they prepare themselves for a career in education, that later, in their settlements on the other side of the Arctic Circle or on the far peninsula, they may make their younger brothers and sisters good citizens.

Indians as well as Eskimos look Mongolian; Eskimos rather like Japanese, although they point out that they are not to be mistaken for Asians. In social intercourse, we easily differentiate between the two according to their temperament: The Indian is usually earnest and somewhat taciturn; the Eskimo is always friendly and cheerful. Investigators, who have lived among the Eskimos for a long time, report that the extraordinarily difficult living conditions have been made endurable only through good humor—that the excessive cold, necessitating animal proximity, which strains the nerves of the whites, is alleviated, as it were, by good humor. The Eskimo has developed a great wisdom, friendliness and cheerfulness, and constant ready helpfulness. Those are the three characteristic traits of this good people which not only bring men together, but ease the community life that once in a while may become too close.

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Annual Report of the New Jersey Chapter

(Presented at the Annual AIC Business Meeting, May 22, 1957, at Akron, Ohio. Here slightly condensed.)

In the 1956-57 fiscal year we had four worth-while and well attended meetings, largely on professional problems:

1. October 23, 1956. Military Park Hotel, Newark, N.J. Speaker, AIC president Nair. Subject, "Attaining Professional Recognition."
2. January 15, 1957. Montclair State Teachers' College jointly with the Science Club of the college, to meet President Partridge and the faculty and to see the much-needed new science facilities obtained largely through the efforts of the New Jersey Chapter Committees. (See page 297). Speaker, Dr. W. O. Baker, vice president of research, Bell Telephone Laboratories. Subject, "Chemistry — Profession or Business."
3. February 26, 1957. Visit to RCA Research Laboratories, Princeton, N.J. The laboratories' directors cordially explained research programs and demonstrated the latest RCA developments.
4. May 3, 1957. Awards Meeting. Theme, "Education — a Plea for More Support." Exhibit of posters. Awards. Speaker, Dr. Detlev W. Bronk. (See report on "A Night of Honors", page 299).

Committee on Science Education At High School Level

A new committee was formed to study problems pertaining to Science Education at the High School Level. C. L. Ayers, vice president, Borne Chemical Company, Inc., is chairman. Dr. Harold F. Wakefield, recipient of the New Jersey Chapter's Honor Scroll, is working with him. This committee cooperated with Dr. Fox of the New Jersey ACS Section, to consider ways of encouraging students to go into science and to develop curricula with more science and mathematics. It reviewed thirteen recommendations prepared by Dr. Fox for consideration by the ACS Executive Committee. Three possible fields of Chapter activity were mentioned: Science Fairs, summer jobs for science teachers and students, and speakers for high school groups. A letter was sent to Chapter members asking their advice. (See THE CHEMIST, July, 1957, p. 285.)

Committee on Science Education At College Level

C. A. Amick was chairman of this Committee and continued the active participation of the New Jersey Chapter in educational affairs begun in 1949 in connection with Montclair State Teachers' College. Emphasis was on improving the facilities in the State of New Jersey for higher education. A luncheon was held with distinguished representatives of Rutgers to discuss funds for higher education and facilities, and offering the services of the Chapter.

Professional Advisory Committee

The newly formed committee was set up to discuss and clarify problems confronting the chemist and chemical engineer in their professional pursuits and to propose considerations which may be beneficial to the AIC and to the chemical profession at large. (See page 318).

Group Insurance

The group insurance plan originally adopted by the New York Chapter was accepted by the New Jersey Chapter.

Membership

The chairman of this committee, Dr. Fred Gajewski, in addition to work on obtaining new members, formed a "chain letter" telephone contact system within the membership to further attendance at meetings.

Annual AIC Meeting—1959

The New Jersey Chapter joined wtih the New York Chapter to plan the Annual AIC Meeting for 1959.

Publicity Committee

The good work of this Committee under Oliver E. Sheffield helped the Chapter to become better known in the state, and even nationally.

On the whole, over the fiscal year, we have had excellent cooperation within the Chapter and have turned out a remarkable amount of work with worthwhile results in diversified professional problem areas.

—Dr. Max Bender
Retiring Chairman

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—Dr. Crawford H. Greenewalt, F.A.I.C. (*Speaking before the Manufacturing Chemists' Association, Inc., White Sulphur Springs, W. Va. at its 84th Annual Meeting.*)

Announced: By Foster D. Snell, Inc., New York 11, N.Y., that Richard S. Ringheim has been appointed as director of marketing and economic research.

Planned: A new $1,500,000 research and development building for the Scientific Instruments Division of Beckman Instruments, Inc., at Fullerton, Calif.

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AIC Activities

Report of the Professional Advisory Committee of the New Jersey AIC Chapter

The members of the Professional Advisory Committee of the New Jersey AIC Chapter for 1956-57 were: Dr. James B. Allison, Cecil L. Brown, Delmer L. Cottle, Frederick A. Lowenheim, John F. Mahoney, W. R. Sullivan, and Max Bender, chairman.

The committee met November 20, 1956 and March 19, 1957, to discuss problems confronting the chemist and chemical engineer in professional pursuits and to consider how the AIC might help meet them.

Four problems were proposed:

(1) Utilization of manpower: How to maximize the output of the chemist with the assistance of technical and nontechnical people.

(2) Professional standing: Is it worthwhile to aim the AIC in the direction of the American Medical Association?

(3) The economic status of older chemists, especially in the face of present day emphasis on starting salaries for the younger ones.

(4) Why belong to The American Institute of Chemists? What do we want from the Institute?

Problem 4 was selected for detailed discussion. Major accomplishments and fulfillments of the AIC on national and New Jersey levels were listed. These included:

1. The work of the AIC during the 30's in alleviating the unemployment problems then confronting chemists.

2. The pointing up of professional problems such as to interest the American Chemical Society which subsequently handled them.

3. The major role played by the AIC which resulted in an appropriation of $15,000,000 by the State of New Jersey for 21 new buildings for six State Teachers' Colleges, including the new science facilities for Montclair State Teachers' College.

4. The AIC's acting as a medium through which individual chemists or groups could raise their voices on professional problems.

5. The AIC's bringing to the young people in universities an understanding of what is entailed in being a chemist. This was admirably demonstrated on December 1, 1955, at Rutgers University at the joint meeting of the New Jersey Chapter with the ACS Student Affiliates. The Chapter is considering the arrangement of a speakers' bureau to provide AIC speakers to universities and high schools to talk about career possibilities and services to society.

6. The AIC has brought ideas about the profession to high school students and teachers. Specific reference is made to the October 23, 1955, meeting of the New Jersey Chapter in Plainfield, N.J., jointly with the ACS Raritan Valley Subsection and the New Jersey AIChE.

Then the Committee discussed improvements which the AIC might consider to more greatly command the interst and cooperation of chemists and chemical engineers:

a. Serve science by more effectively helping schools to provide scientific education. The Committee expressed alarm at the New Jersey State Legislature recently working to cut out $1,600,000 being requisitioned for the New Jersey State University (Rutgers) for a new biology building ($1,000,000.) and additional facilities to the Law School. This hurt in the face of the $50,000,00 minimum which the University needs for setting up a Science Center, and preparing for enrollment predicted to increase greatly in a few years. Facilities in New Jersey for higher education have to be greatly expanded and the AIC should play an important part in this expansion.

b. Serve science by helping students, chemists, and chemical engineers to develop themselves as scientists in the service of society.

c. Improve the AIC periodical, THE CHEMIST, giving it stature as a topflight periodical which would "sell" the AIC more than ever. The present views of the Committee on this are:

1. The questions, "Why belong to the AIC?", "What Constitutes Professionalism?" or "The Responsibility of the scientist to society," etc. involve quite a foggy atmosphere, one where all have different ideas and therefore it takes much talking to clarify matters. Accordingly THE CHEMIST, in publishing this thinking, is performing a very important and useful function. People are trying hard to grasp at these things.

2. However, THE CHEMIST could also contain more papers (see the recent writing by Vannevar Bush, *Science*, Jan. 11, 1957, entitled "Professional Collaboration") covering the subject of education in general; salaries and other personal problems; our service as scientists to society not only from the viewpoint of science but also in civic duties; working conditions; ethics, etc. Also there could be articles which present and summarize existing knowledge on issues of social significance, i.e., as in the controversy over fluoridation, so as to enhance our background and help us make up our minds about where we stand on such matters. Probably, this would effectively be handled by a Board of Editors.

3. Finally, in line with the preceding comments, the Committee recommended that a check list sheet be distributed annually, say with the annual notice of dues, asking the membership to make its choice in order of importance from the various categories of material appearing in THE CHEMIST.

d. The term "Professional" was examined critically. While the Committee holds as basic the underlying thought of service to mankind, whether scientific service or civil service, the term is still

thought to be semantically vague. Perhaps this vagueness could be alleviated by talking in terms of the AIC giving us the opportunity to be "good citizens" in situations in which our scientific training should make us helpful. These situations might arise at the University, in industry, or in the community. This concept allows us each to behave as the specialists we are in our fields and to be of utmost service. Thereby it might improve one's "Professional Standing, Pride, Dignity, etc.", which so many chemists seem to complain of not having. The AIC thus serves as a common basis for chemical people to discuss and get together even though they could not well communicate otherwise because their fields of study are so far apart.

e. Does being called a Fellow of the AIC mean so much more than ordinary membership? How make the title "Fellow" be more desirable and attractive to the individual? It was granted that it has attraction, but after one is a Fellow, then what? Does it lend greater strength to the aims of the AIC? Is there enough significance to this title of Fellow to make it worthwhile to the AIC to maintain such? We are merely asking for information here, but this does strike at the basis of AIC because the incorporation of AIC into ACS foundered on the AIC differentiation by membership grades. Now we are questioning the value of membership grades in encouraging those who have reached the Fellow status.

—Dr. Max Bender
Chairman

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The Chemical Industry In Europe

Published by the Organization for European Economic Cooperation. Paris. 1956. 209 *pp.* $2.00.

This second report to be drawn up by the Chemical Products Committee of O.E.E.C. covers 1954 and the beginning of 1955. It differs from the first report in that it contains pertinent information about the American chemical industry and thus provides a general picture of between two-thirds and three-quarters of the world out-put of chemicals.

In order to obtain an idea of the comparable magnitude of the chemical industry in the various countries and of the place that industry occupies in the industrial activities in them, the committee has drawn up a table based on the manpower employed. The reader has been cautioned to remember that such a figure does not have the same importance in the United States, where expansion in the chemical industry has been on the basis of petroleum chemicals which lend themselves more readily to automatic processes than chemicals from coal which are the basis of the European chemical industry.

This assessment of the importance of the chemical industry in Europe and the United States serves as an introduction to a study, first of the various factors of supply and demand which affect the chemical industry and foreign trade in chemical products; and second, of the various segments of the chemical industry, beginning with basic chemical and including petroleum chemicals; dyestuffs; tanning materials; paints; medicinal and pharmaceutical products; soaps and detergents; fertilizers; plastics; miscellaneous chemical and photographic supplies.

—Dr. Frederick A. Hessel, F.A.I.C.

Plastics Progress 1955

Papers and discussions at the British Plastics Convention. Edited by Phillip Morgan, M.A. Philosophical Library. 1956. 432 *pp.* $17.50.

Third to appear under the title of Plastics Progress, this volume follows the form of the reports of the two previous conventions. The full texts of the papers

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are printed, in many instances substantially longer than the paper actually delivered. With these is included a transcript of the discussions which followed. Much practical information comes out in the informal give-and-take of these sessions.

The subjects include the following: Polymer Structure and Properties; Expended Plastics; Thermoplastics; Extrusion; Work Study and Productivity; Injection Molding; Patents; Foundry Resins, and Glass Reinforced Plastics. A subject index, and the references for each paper are valuable adjuncts, as are the graphs and photographs which illuminate the text.

Chemists in the plastic field will find this book of real interest.

—Dr. Frederick A. Hessel, F.A.I.C.

Legal Medicine, Pathology and Toxicology

By Thomas A. Gonzales, Morgan Janos, Milton Helpern and Charles A. Umberger Appleton-Century-Crofts. 1954. 1349 *pp.* $22.00.

This second edition is a major contribution to the field of forensic sciences. Toxicologists, police chemists, medical practitioners, and pathologists will find it valuable. It is more than 40% longer than the previous edition and contains revised and new material. The purely medical portions of the text are comparable to the best in the field. Almost half of the book is concerned with toxicology. Of this, more than half is devoted to analytic toxicology, in itself an excellent text. One chapter of 40 pages considers ethyl alcohol and the evaluation of experimental work on intoxication. The sections on the analysis of the general unknown, the identification of sedatives, the determination of inorganic metallic poisons and interpretation of spectrographic plates are comprehensive. Color reactions, participation and characteristic crystals, and special purification procedures are discussed in detail. Extensive bibliographies are included. The chapters on descriptive and occupational toxicology are not quite up to the quality of those devoted to analytical procedures. It is unfortunate that such a fine text is marred by an inadequate index. However, the book is well written and easily the best American reference work in the field.

—Mark M. Luckens, F.A.I.C.

New Publication: The *Journal of Molecular Spectroscopy*, by Academic Press, Inc., 111 Fifth Ave., New York 3, N.Y. Volume 1, No. 1, is dated May 1957. The editor is Dr. Harald H. Nielsen, Department of Physics, Ohio State University, Columbus, Ohio.

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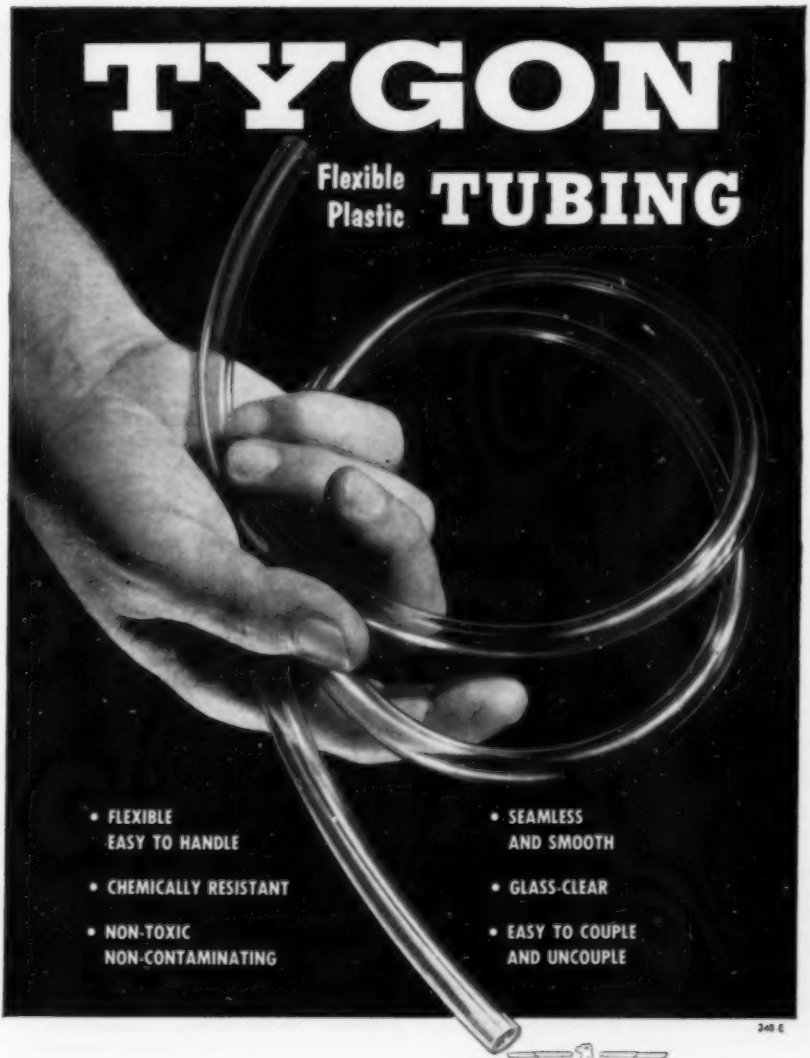

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